SOME CLINICAL CONSIDERATIONS ON ACCESS TO BENIGN INTRA-LARYNGEAL NEOPLASMS THROUGH EXTERNAL INCISIONS; AS ILLUSTRATED IN A SMALL GROUP OF PERSONAL OBSERVATIONS HERETOFORE UNREPORTED.

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SOME CLINICAL CONSIDERATIONS ON ACCESS TO BENIGN INTRA-LARYNGEAL NEOPLASMS THROUGH EXTERNAL INCISIONS; AS ILLUSTRATED IN A SMALL GROUP OF PERSONAL OBSERVATIONS HERETOFORE UNREPORTED.

BY far the greater number of intra-laryngeal neoplasms are accessible to laryngoscopic procedure; and it is the general opinion of those whose actual experience renders their judgment reliable, that no external operation should be resorted to, in the absence of immediate emergence, until the failure of intra-laryngeal resources has been amply demonstrated.

In certain exceptional instances, however, peculiar conditions of location and magnitude of growths, or of age, vigor, and tractability of patients, render laryngoscopic interference hazardous or impracticable, and external access imperative; while there is an intermediate group of cases in which safety in intra-laryngeal manipulation is secured by preliminary tracheotomy or its equivalent.

Several external operations are practiced for direct access to intra-laryngeal neoplasms, the choice, in any instance, being determinate upon the individual peculiarities of the case. These operations are: Section of the middle crico-thyroid ligament; section of the thyroid cartilage in the middle line; section of thyroid cartilage and middle crico-

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thyroid ligament; section of the entire larynx; section of the trachea; and section of the thyro-hyoid membrane.

Section of the cricoid cartilage is rather to be avoided, if possible, as its division is apt to impair the solidity of the laryngeal skeleton, and is liable, though but rarely, to be followed by necrosis.

Section of the thyroid cartilage is likewise to be avoided if other means suffice for ample access to the neoplasm; as the consequent agglutination of the anterior portions of the vocal bands, in cicatrization, cannot be effectually prevented; and the resulting diminution in the length of the vibrating portions of the vocal bands necessarily impairs the quality of the voice, the shrill accentuation of which attracts attention, which, to a sensitive female particularly, may be a more or less continuous source of mortification.

I.

SECTION OF THE MIDDLE CRICO-THYROID LIGAMENT.

Small growths, immediately beneath the vocal bands, or upon their edges, and inaccessible to intra-laryngeal manœuvres, are not infrequently accessible to direct attack through an incision made in the middle crico-thyroid ligament. This operation, the easiest of the series, involves the minimum risk incurred in artificial openings into the air-passage; leaves but an insignificant external cicatrix; and does not engender any impairment of vocal function. It is readily performed; the opening permits satisfactory illumination; and the wound, in the adult, is usually large enough for the introduction of a canula, should there be occasion to keep it patent for a few days or longer. There is, therefore, sufficient reason to select this operation in preference to other external methods of access, when the size and location of the growths are such as to offer a prospect of success in the object to be accomplished.

It is indicated in individuals who gain their livelihood by public use of the voice, and in those who are rendered nervous and irritable by the presence of growths which impair their vocal powers, even when the function of respiration is not at all impeded.

OBSERVATION.—*Case of section of the middle crico-thyroid ligament for direct destruction, by the galvano-cautery of benign subglottic neoplasms of the vocal bands.*

* * *, a gentleman, thirty years of age, had been under my care some years previously with extensive papillomata, occupying both vocal bands, both ventricular bands, and several points on the laryngeal face of the epiglottis. These had been removed by evulsion, at various interviews, in the usual manner; but small nodules had remained beyond my reach, and beyond the reach of other laryngoscopists, directly beneath the anterior commissure of the glottis, and upon the lower surfaces of both thickened vocal bands. The voice, previously aphonic, was audible, but hoarse and muffled; and was not loud enough for public use, or for general conversation save with persons in close proximity. This condition having continued with but slight amelioration, despite a few series of treatments at prolonged and irregular intervals, I was again consulted on May 5, 1878, as to the utility of an operation frequently suggested during my previous care of the case, but hitherto avoided by the patient in the hope of spontaneous restoration of the voice, or its improvement by less disfiguring methods. The proposed operation comprised division of the middle crico-thyroid ligament, and immediate destruction of the growths by direct access with the galvano-cautery.

On May 12th, with the assistance of Drs. John H. Packard and R. M. Smith, I performed the operation upon the sitting patient, without resort to anæsthesia. A vertical incision, half an inch in length, exposed the ligament which was then divided from its attachment to the thyroid cartilage. The ligament retracted immediately and left an opening affording good access to the parts, which were brilliantly illuminated by reflected sun-light, so that it was not difficult to tear off the growths, of which there were several, at the commissure, and to sear their point of implantation; as well as to destroy two small masses of growths on the lower surfaces of the vocal bands, respectively, with a fine pointed galvano-cautery. Durham's double canula was inserted through the external opening, and retained for a few days in order to maintain patency of the wound in case subsequent manipulation should be required; but further cauterization was found to be unnecessary, and the wound was allowed to close. An abscess formed on each side of the wound, requiring attention for a few days; otherwise recovery

was prompt and satisfactory. Marked improvement of voice became manifest as soon as the wound cicatrized, and at last accounts, a few months ago, had remained fairly good for conversational purposes ever since ; of considerable volume, though not loud enough for public use, nor as clear as a normal voice. The thickening of the vocal bands continued marked the last time I examined the larynx, some few months after the operation. The scar of the external incision is insignificant, and invisible above the shirt collar.

II

SECTION OF THE THYROID CARTILAGE.

Thyrotomy, thyroidotomy, or section of the thyroid cartilage, is indicated to remove injurious intra-laryngeal neoplasms which are not accessible to laryngoscopic operation, or to the simpler and less pernicious external procedures. Its extreme liability to impair the voice irretrievably is always to be borne in mind ; and for this reason it may be questionable, in certain cases, especially in children, when the growth is in the upper portion of the larynx, whether the more conservative operation of sub-hyoid pharyngotomy should not be performed in preference.

If thyrotomy suffices to expose the interior of the larynx sufficiently, there is no occasion to incise the conoid ligament, as is usually done, and done with impunity ; and if the extended incision through both these structures is insufficient, then it becomes necessary to divide the cricoid cartilage in addition, thus performing complete laryngotomy, —an operation sometimes practised, but not with impunity. The objections to unnecessary division of the cricoid cartilage are its special proclivity to undergo necrosis when injured, and the fact that this strong structure is the base, so to speak, of the laryngeal skeleton.

Thyrotomy, simple or extended, is usually practised after a preliminary tracheotomy, immediately preceding the major operation, or performed some days or weeks in advance as may be. It can often be safely undertaken without preliminary tracheotomy, however, as practised by Brauers, Cutter, of Boston, Mass., and others, and as done in my first

operation,* and in a recent instance herewith recorded; which latter is the first instance, during thirteen years, that I have been compelled to resort again to this method of access for removal of intra-laryngeal neoplasm.

OBSERVATION.—*Section of the thyroid cartilage for evulsion of infra-glottic papillomata.*

* * *, a lad, eight years of age, was recently brought to my clinic in the Jefferson Medical College Hospital with aphonia and intense dyspnœa. The supra-sternal soft tissues and the sub-sternal tissues were forcibly depressed in inspiration, as is witnessed in membranous croup. Two years before, he had an attack of whooping cough, subsequent to which his voice gradually became more and more husky, until it finally became extinct. He had had great difficulty in respiration for a number of months, latterly complicated with suffocative paroxysms at night. There was considerable general pulmonary emphysema. The cutaneous surface was cyanotic. Appetite was poor. There was great nervousness, so great, indeed, that the laryngoscopic inspection had to be practised during a fit of hysteric sobbing. The epiglottis and the upper portion of the larynx were seen to be normal, but it was impossible to direct the illumination upon the glottis during the momentary opportunities that were afforded. The subjective symptoms, however, were sufficiently indicative of important obstruction in the larynx; and the history of whooping cough, grad ually increasing dysphonia, and subsequent dyspnœa were indica tive of obstruction from benign neoplasm, in all probability papil loma, as the sequel proved to be the case.

As the demand for relief was urgent, and intra-laryngeal manipulation was hazardous in the excited condition of the patient, I admitted the lad to the wards of the hospital, April 23, 1880, and performed immediate thyrotomy before the medical class then assembled. Anæsthesia was produced in four and a half minutes by bromide of ethyl, administered with some struggling, under the direct supervision of my colleague, Dr. R. J. Levis, the staunch advocate of this recently employed anæsthetic. There were several enlarged veins in the track of the knife after the cutaneous incision had been made; and during the few minutes occupied in tearing the connective tissue and pushing these

* *The Medical Record*, N. Y., 1867, p. 218.

vessels aside, the effect of the anæsthetic passed off and rendered a second administration necessary for a few minutes. I then divided the thyroid catilage from below upward, merely puncturing the uppermost edge of the crico-thyroid ligament; and when the wings of the cartilage were separated, came at once upon a mass of neoplasms, the bulk of a blackberry, attached anteriorly to the inferior surfaces of both vocal bands. These were rapidly removed by evulsion with forceps; the entire operation, including the stops for anæsthesia, occupying fifteen minutes. The effect of the bromide of ethyl was admirable in this instance, not the slightest unpleasant symptom following it. The cutaneous wound being secured by two sutures, the parts were supported by adhesive strips, and covered with a linen rag greased with carbolized oil. Consciousness was perfect before the dressing was finished, and at its conclusion the boy was placed in bed, and drank heartily of milk. Slight expectoration of blood took place for a few hours, but little air escaping externally in coughing. Recovery ensued promptly without any set-back; and the patient was dismissed at the end of a fortnight, with subsidence of the emphysema, a rough, audible voice, and a cicatrized wound.

III.

SECTION OF THE TRACHEA.

Tracheotomy is sometimes practiced, not only to secure immunity of respiration in case of untoward result from intra-laryngeal operations upon neoplasms of considerable magnitude, but with a view of operating upon the growths directly through the tracheotomy wound. In the few preliminary tracheotomies performed by myself in cases of intra-laryngeal neoplasms, I have failed to be able to make avail of the opportunity for immediate access to the growth, by reason of the entrance of blood into the trachea, and its disturbance by cough to such an extent as to render it impracticable to illuminate the larynx sufficiently from below, or to be able to operate without risk of injury to sound structures and, have, therefore, been compelled to be content with the original object of the procedure—to ensure safety from asphyxia during subsequent laryngoscopic interference.

It sometimes happens, however, that access to infra-glottic growths may be effected through the tracheotomy wound, a few days after the operation.

OBSERVATION.—*Removal of subglottic fibroma through the wound of tracheotomy. The tracheotomy by Dr. S. W. Gross.*

* * *, a watchmaker, aged forty-eight years, was brought to my office Jan. 8, 1878, almost suffocating from dyspnœa, with harsh stridor in both phases of respiration. Laryngoscopic inspection revealed the existence of one or more intra-laryngeal neoplasms, the extent of which could not be accurately determined, on account of great swelling of the arytenoid cartilages and considerable pendancy of the epiglottis. The story was that the voice had been hoarse for a number of years, but that aphonia and the dyspnœa had rapidly augmented within the few days of their occurrence, consequent upon prolonged exposure to inclemency of weather. An acknowledgement was made of primary syphilis in early manhood, but there was no absolute trace of dependance of the laryngeal condition upon the initial specific lesion, nor did the subsequent history of the case increase the imputation of its specific origin.

The dyspnœa became so great on my attempt at intra-laryngeal manipulation, that it was deemed prudent to desist, and perform tracheotomy as a preliminary measure. As the patient had not suitable accommodations at his home to provide for effectual supervision after the operation, I had him admitted to the surgical ward of the Jefferson College Hospital, and on the following day my colleague, Dr. S. W. Gross, in charge of the ward, performed the tracheotomy, without anæsthesia, at my request. The patient recovered promptly from the operation. A few days afterward, he sought the laryngoscopic room under my charge to undergo treatment for his growths. On removing the canula to examine the tracheal fistula, I was able to observe the lower portion of a growth through the wound. The mass was readily seized with ordinary nasal polyp forceps, and removed by torsion. It was the size of a small lima bean, and proved, under the microscope, to be a fibroma. Laryngoscopic examination proving the evulsion to have been complete, the wound was allowed to close, and became firmly cicatrized spontaneously within three days. The attachment of the growth could not be satisfactorily ascertained by tracheoscopy, as the entire lower surface of the anterior commis-

sure of the glottis, whence it probably had attachment, was bloody; but laryngoscopy showed that it had been, at all events, infra-glottic. The swelling of the arytenoid cartilages had entirely subsided.

The patient's voice became sonorous as soon as the wound had healed; was quite loud after the wound had closed; and within a few weeks was reported as good as ever, even to disembarrassment from hoarseness, which had long become habitual.

IV.

SECTION OF THE THYRO-HYOID MEMBRANE.

Sub-hyoid pharyngotomy, supra-thyroid laryngotomy, or section of the thyro-hyoid membrane is occasionally practiced for direct access to intra-laryngeal growths. Clinical experience as to its efficacy is too meagre and unsatisfactory to indicate its proper position as a legitimate operation for external access to intra-laryngeal growths. Experiments upon the cadaver, as well as the reported location of growths in recorded operations, seem to verify the assertion long ago made by Morell-Mackenzie, that the very cases favorable for the operation are those which, as a rule, can be most easily treated through the mouth. In the instance recorded below, it was demonstrated that the access afforded to the growths by the operation, was less than that previously attained laryngoscopically.

In the case of females especially, and in individuals to whom integrity of vocal powers is of importance, it is possible that access to growths high up may be made by this form of median pharyngotomy, without recourse to the more detrimental operation of median division of the thyroid cartilage. The access afforded to instrumental interference is limited in this operation; and the size of the epiglottis, and general anatomical outline of the upper structures of the larynx, may have to be taken in serious consideration in estimating the propriety of resort to this operation, in cases of doubt.

From some personal operations performed on the dead subject by Dr. John H. Packard, both previously to the case

herewith reported and subsequently, that gentleman expresses the opinion that this operation would afford sufficient access to neoplasms on the vocal bands in the adult, but that the parts are too small in the child to make it available, even upon the cadaver.

OBSERVATION.—*Sub-hyoidean pharyngotomy upon a child for direct access to benign intra-laryngeal neoplasm; with failure of satisfactory access to the growth. The pharyngotomy by Dr. Packard.*

* * *, a female child, five years of age, was placed under the care of Dr. John H. Packard, of Philadelphia, with aphonia dating from birth, and slight dyspnœa, with occasional exacerbations at night. Being invited to precede the doctor in a laryngoscopic examination in consultation, I detected, by direct sunlight, a neoplasm at the anterior commissure of the vocal bands, and apparently at the very root of the epiglottis. This diagnosis being confirmed, I inserted a pair of rectangular forceps at Dr. Packard's request, and succeeded at once in removing a fragment of papilloma, the bulk of a small pea. The child resisted submittance to a second manipulation, and further interference was postponed for the day. At a subsequent interview, about a week later, I failed, in the one chance unwillingly accorded me, to remove any portion of the growth. As circumstances rendered repeated interviews with the patient impracticable, it was determined, on further consultation, to attack the growth from the exterior upon a convenient occasion in the near future, and to perform subhyoidean pharyngotomy in preference to thyroidotomy, in order to avoid direct injury to the vocal bands, which, in all probability, would impair the voice irreparably, and thus be a source of annoyance to the girl as she grew to womanhood; and because the neoplasm was sufficiently high up in the larynx to promise satisfactory access by the method proposed.

In December, 1879, Dr. Packard performed the pharyngotomy, under anæsthesia, with the assistance of Drs. Seiler, Harvey, Shippen and myself; but when the epiglottis was drawn out through the wound it was found impossible, either by direct sunlight or by reflected light, to illuminate the interior of the larynx beyond a meagre area just below the upper border of the aryteno-epiglottic folds; so that the growth could not be exposed to vision.

Knowing the location of the neoplasm, I introduced the forceps and withdrew a small portion ; but the parts were too small to admit the passage of both finger and forceps, and during several attempts at further removal I found it impracticable to avoid confounding the contour of the tumor with that of the supra-arytenoid cartilages, which bent forward, the moment the instrument reached the growth, to such an extent, during the spasm provoked by the manipulation as to become firmly pressed against the neoplasm, and thus confound the digital perception of their respective boundaries. The risk of catching one or both supra-arytenoid cartilages was too great to justify a hit or miss at evulsion ; and I gave the attempt up. Drs. Seiler and Packard exerted their skill in similar efforts without better result.

As the dyspnœa seemed entirely relieved when the parts were held in apposition, Dr. Packard closed the wound and had the child removed to bed, with the intention of awaiting recovery from the pharyngotomy, and of being guided by circumstances as to the propriety and character of further interference.

Recovery was prompt, and at last accounts there had been no return of dyspnœa. The voice remained husky ; but was no longer aphonic. I have not seen the patient since, and no opportunity has been afforded for a laryngoscopic examination. The patient having been lost sight of, it is impossible, at present, to report the ultimate result of the operation.

In this case more was accomplished by laryngoscopic procedure, both as to illumination of the neoplasm and actual evulsion, than by the direct access afforded by the external operation.

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